RESIDUE OF THE EXTINCT BIRDS OF QUEENSLAND AS YET DETECTED.

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(Plates XXIII. and XXIV.)

Necrastur, n.g., Falconidæ.

Proximal end of a right humerus, wanting part of the radial tuberosity and distal portion of the pectoral crest (Pl. xxiv., fig. 1*a* and 1*b*).

The guide to the systematic neighbourhood of this fossil is discoverable in the seat of the insertion of the anterior coracoid ligament on the dorsal aspect of the radial tuberosity (fig. 1*a A*). In the great majority of birds the ligament occupies, and is inserted into, some part of a horizontal groove, which is variously modified in length, depth, width, straightness, and parallelism of its sides. In all these respects, singly or together, it may be studied in the *Psittaci*, *Strigidæ* (mostly), *Passeres* (mostly), *Coracidæ*, *Columbæ*, *Otididæ*, *Grallæ*, *Herodiones*, and *Anseres*. Occasionally it is reduced, as in the Rails, to two short converging walls enclosing a small pit close to the anterior edge of the bone, or to some such remnant of its full development in the *Psittaci*. In the minority it is merely a more or less irregular depression of variable depth and definition, affording on the whole so little aid to the investigator that by it alone he could hardly distinguish safely between the eagle and pelican. But happily it assumes in many of the *Falconidæ* a peculiarly distinctive form, one on which fancy bestows a certain crude resemblance to the footstep of a horse trotting on soft clay. This is best exemplified in *Haliaetus leucogaster*, wherein it may be observed as a subtriangular pit of which the basal side slopes downwards with a transversely convex surface to a flat crescentic area embracing the rounded contour of its foot. In this form it occurs more or less obviously and symmetrically in *Haliastur*, *Nisaetus*, *Astur*, *Baza*, *Circus*, and *Lophoictinia*, and even in *Ninox* among the *Strigidæ*, but in no other birds has it been recognised by the writer. The apparent triviality of such a feature as this, though certainly diminished by its restriction to and frequency in one family, would hardly lead us to expect for it any great persistence in time, yet it is exhibited in the fossil in even greater precision than in *Haliaetus*. Whether then it be supported or otherwise by accompanying characters, it must hold its own and stamp the fossil with the seal of the *Falconidæ*. It does, however, derive sufficient countenance from the presence and position of a linear deltoid ridge on the ventral aspect of the bone; this, as usual in birds of prey, runs downwards parallel with and near to the midline of the shaft.

With guidance up to this point we have to be satisfied, for to no extant genus can we find direction in the rest of the fossil's structure. The head is narrow and remarkably prolonged upon the pectoral ridge, towards which it descends uninterruptedly without permitting the formation of an ulnar tuberosity (Pl. xxiv., fig. 1*b* *A*). If we take the humeral head of a *Menura*, lessen its curve and reduce the gibbosity of its ventral side, we shall reproduce that of the fossil on a smaller scale; and *Menura* alone appears to represent the extinct hawk in this particular. The form of the shaft is no less remarkable, and for its parallel we must resort to *Phalacrocorax*. It is eminently trihedral, presenting on its ventral aspect two faces, a flat anterior and a slightly convex posterior surface. These meet in a median culmen, and this again divaricates opposite the pneumatic foramen into two branches, the one merging into the strong ridge supporting, in the *Falconidæ*, the radial tuberosity; the other more subdued, but still distinct, as it is in no other bird, goes to the ventral edge of the head (Pl. xxiv., fig. 1*b* *B*). The sub-tuberous pneumatic foramen is small, round, and thick-walled; the tunnel into which it opens proceeds uninterruptedly into the substance of the bone. Such are the generic traits of our fossil. As before intimated, it shows a deltoid ridge running parallel with the culmen at a distance of two millims. on its posterior face (Pl. xxiv., fig. 1*b* *C*).

The strong differential characters of this humerus render it impossible to form any decided opinion as to the bird's relations with recent genera, but after much consideration the writer is inclined to think that on the whole it favours *Nisaetus*, the little crested eagle, more than any other. *Necrastur* was evidently a highly specialised member of its family, and if, from the extended surface of articulation, allowing a wider sweep of wing in the same plane, and from increased muscular room and superior leverage obtained on and from the prismatic form of the shaft, we may infer unusual faculties in flight, a word significant of these to some extent—*alacer*—may be allowed to stand as the second term of its name.

Distal end of an ulna—a bone having the characters of a falconine ulna and corresponding fairly in size with the preceding humerus may be placed with it until it can be shown to have belonged to a different hawk.

Lobivanellus sp.

The remains of a very fragile distal end of a tarsometatarse attest the early existence of this genus. While still perfect the fossil was clearly identified generically, but before its specific characters could be ascertained, the cover of a book, inadvertently allowed to rest upon it, crushed it beyond the possibility of restoration for descriptive purposes.

Tribonyx effluxus, n.s.

The bone figured [P.L.S.N.S.W. Vol. iii. (2), Pt. 3, pl. 35, fig. 9*b*] as the distal end of the humerus of a *Fulica (F. prior)* proves not to belong to that genus, but to *Tribonyx*. The error arose from an inadvertence for which no excuse can be offered—due attention was not given to the shape of the radial trochlea as it exists in the fossil and in *Tribonyx*, and undergoes change in *Fulica*. In *Fulica*, *Gallinula*, and *Porphyrio*, the antero-interior side of the trochlea is emarginated, and the emargination, aided by a slight flexure outwards of the distal end, gives a perceptibly sigmoid shape to the whole. In *Tribonyx* the antero-interior side of the trochlea is entire, and its shape as a whole is a pretty regularly convex oval. From *T. mortieri* the fossil differs in the following points: the radial trochlea is shorter and makes with the long axis of the shaft a more oblique angle; the ectepicondylar tubercle is less tumid and there is consequently more space between it and the trochlea; the ulnar trochlea is broader at its junction with the inner condyle. In size the bird was about equal to *T. mortieri.*

PORPHYRIO MACKINTOSHI, n.s.

Distal extremity of a right tarsometatarse (Pl. xxiv., fig. 2*a* and 2*b*). It is probable that this and *P. reperta*, m., will eventually be placed in a new genus, as in both the hind toe is less elevated than in the recent genus, and the inner trochlea (imperfect in the cotype of *P. reperta*) is found in the present fossil to be distinctly shorter, or rather not to extend so far distad as in *G. tenebrosa*—in fact, it fails distinctly to reach as far as the mesial trochlea instead of overlapping it. The present species differs from *P. reperta* in its greater size, showing, indeed, in this respect a superiority over the existing species, in a prolongation of the mesial trochlear surface nearly to the base of the process on its plantar aspect, and in the much larger size of the depression for the hind toe. It is dedicated to a gentleman who rendered most kindly aid to the collector, Mr. Hurst, during his search for fossils of this kind near Warwick.

GALLINULA PERALATA, n.s.

The humeral index of the recent *G. tenebrosa* is 7·81, its tarso-metatarsal index 7·94. The fossil metatarse, on which the species *G. strenuipes* was founded, has an index of 8·18, and, assuming approximately identical proportions in extinct and living species, the humeral index of *G. strenuipes* should be 8·03 or thereabouts. A humerus of a gallinule with an index so far raised as 9·18, as in the present fossil, cannot therefore be referred to *strenuipes* without forsaking a base of determination too useful to be quitted needlessly. Little short of the discovery of a complete skeleton, a most unlikely event, would convince us that a wing so strong and a foot so comparatively weak as are indicated by the present humerus and the described metatarse co-existed in the same species of gallinule.

To difference of transverse proportions we must add no less decided difference in proportionate lengths. The humerus and metatarse of *G. tenebrosa* are equal in length, whereas the present humerus is shorter than the metatarse of *G. strenuipes* in the ratio 62·5 : 74·0. In brief, it is a fifth shorter and an eighth broader in the shaft than it should be were it derived from *G. strenuipes.*

Compared with the humerus of *G. tenebrosa,* the present bone has, apart from its still superior strength, two good specific characters—one of which consists in a more pronounced curvature of the shaft, the other in a more decided excavation of the antero-interior side of the palmar end of the radial trochlea (Pl. xxiv., fig. 3*b* *A*). In length the bone does not differ from the humerus of *G. tenebrosa.*

PALÆOPELARGUS, n.g., HERODIONES.

Distal end of a right "medius" metacarpal in conjunction with that of the "annularis" (Pl. xxiv., fig. 4*a* and 4*b*).

After tabulating the details of form and structure in the articulating surface of this bone in all available genera of birds, comparing the fossil therewith, repeating the process after a considerable interval of time and obtaining at the second trial the same result as before, the writer is led to regard his view of it as an approximation to the truth.

The following are the characters from which the status of the extinct bird is to be ascertained :—

Contour of the articulating surface oblong, elongate, narrow. Facette for the anterior and chief part of the proximal surface of the basal "medius" phalanx narrow and rounded (a form partly due to the abrasion of the edges); eminence for posterior concave part of the surface long, oblique, subcrescentic. End of fourth metacarpal moderately produced beyond the level of the rest of the articulating surface, its facette for the fourth phalanx nearly flat, elevated, its base defined posteriorly by a pronounced depression of the metatarsal surface. Anterodorsal surface of shaft with the usual tendinal groove, which is well defined by ridges, posterior to it and near the edge of the articular surface a short ridge defining a second tendinal groove. Shaft compressed inferosuperiorly.

The long quadrangular form of the articulation enables us to eliminate the families which do not agree with the fossil in those particulars—namely, the *Psittaci*, *Grallæ*, *Anseres*, *Ardeidæ*, and among the *Ciconidæ*, *Ciconia*, all of which, with some exceptions in a minor degree among the *Grallæ*, have also the fourth metacarpal not produced beyond the third, and the shaft subcylindrical or subtrihedral, except in *Esacus* and *Lobivanellus*, in which it is compressed. Of birds with an elongated articulation the Passeres have the third metacarpal excessively prolonged and the small articular eminence lenticular or more or less obsolete; it is much the same with the *Halcyonidæ* and *Pittidæ*. The *Falconidæ* have the third metacarpal somewhat prolonged, but the eminence is lenticular. The *Strigidæ*, with an oblique oval eminence, have the third metacarpal not at all prolonged, and almost the same may be said of the *Caprimulgidæ* and *Columbæ*.

The metacarpals most like the fossil bone are afforded by *Carphibis* and *Xenorhynchus*, and of these the latter approaches it most nearly in general form and size combined—*Carphibis* in the form of the articular eminence and presence of the short tendinal groove. But the difference in the extent to which the third metacarpal of the fossil is produced removes it widely from both these genera and compels one to propose for it the provisional genus named in the title. As the size of this part of the skeleton is somewhat considerably greater than it is in the Jabiru, the bird to which it belonged may be supposed to have been on the whole correspondingly larger, and if so, we may picture to ourselves a bird which may fairly be called *nobilis*.

Distal end of an ulna. This bone can only belong to the *Anseres* or to the *Herodiones*, and as it corresponds in size with the metacarpal preceding and does not protest against entering the same genus and species with it, such may be its domicile for the present.

PLATALEA SUBTENUIS, n.s. (Pl. xxiv., fig. 5*a* and 5*b*).

Proximal two-thirds of a right femur with the trochanter edges abraded. No subtrochanterian pneumatic foramen; two minute posterior foramina; trochanter narrow, continuous with extensor cruris ridge; space between trochanter and neck narrow; neck but slightly contracted; head but little expanded; shaft feebly curved, subcylindrical. After rejecting in our search for the living kindred of the bird now under scrutiny those femurs wherein the subtrochanterian foramen is present, the *Falconidœ*, *Gouridœ*, *Otididœ*, *Xenorhynchus*, &c., also those of the Passeres which possess a large posterior foramen, we find our means of discrimination almost restricted to the contour of the proximal surface of the bone and the relative position of the extensor cruris ridge. Those bird femurs, which on a fore end view are separable from the rest on account of the surface being in the first place subelongate, and in the next neither approximately hour-glass shaped nor considerably narrower immediately behind the head, in other words, devoid of a sudden contraction at any point in the trochanterian region, which are at the same time nearly straight in the proximal half of the shaft, and are comparable with the fossil in size, are to be found among the ibises and spoonbills, and not elsewhere. We may therefore conclude with some confidence that our fossil is derived from the *Plataleidœ*. But beyond this progress becomes hazardous, the fact being that the femurs of *Platalea* and *Carphibis*, indistinguishable generically from the fossil, are equally so one from another. Were they not from living birds, they would indeed be attributed to the same species of the same genus, a state of things, by the way, issuing a caution against hasty identification of fossil with recent bones of this class; yet, as the chances are very great against so close an approximation of structural form occurring in a third genus, the fossil must be assumed to belong to one or other of the genera named, and as the spoonbills show greater fixity of type than the plurigeneric ibises, the judgment is fain to follow even so dubious a clue to freedom from perplexity. The specific differences from *P. regia* and *P. flavipes* observable in the fossil are a greater flattening of the proximal end of the shaft on its posterior surface and a diminution of the transverse axis of its distal moiety, resulting in a more cylindrical but more slender form.

Two distal moieties of the tibia, with all the characteristics of that bone in *Platalea*, but with size and proportions in accord with the femur above described, may be referred to it with some confidence that they belong to the same species. They at least prove the existence of a spoonbill among the other birds of the period, and thereby tend to confirm the accuracy of the preceding determination.

PELICANUS PROAVUS, n.s. (Pl. xxiv., fig. 6*a* and 6*b*).

The small pelican for which a name is proposed reveals itself in a left tarsometatarsal, of which the inner trochlea is mutilated, but sufficiently perfect to show that it was distinctly longer than the outer. By this character it is separated from all those birds which have the lateral trochleæ approximately equal in length, as well as from those in which the outer is very evidently the longer, and is associated with the birds of prey, diurnal and nocturnal, kingfishers *(Dacelo)*, *Menura*, *Pitta*, *Podargus*, *Herodiones*, *Pelicanus*, darters, and grebes, and doubtless others. Its trochleæ are not disposed nearly on the same plane, nor would a section of its shaft be either crescentic or planoconvex in shape ; it is therefore foreign to the *Falconidæ*, *Strigidæ*, *Menura*, and the *Megapodes*. Its distal expansion is gradual and subelongate, very different to that of the *Herodiones*, which also have nearly co-equal trochleæ. With the bone in the kingfishers, nightjars, pittas, and grebes it cannot be compared. In *Pelicanus*, however, we find a complete reproduction of the structural features of the fossil, displayed in the same elongated pulley of the mid-trochlea, reaching with rapidly converging edges to the plantar surface, in the large elongately oval foramen opening on the plantar surface in a hollow formed by the convergent roots of the lateral trochleæ, and on the dorsal surface at the end of a long deep sulcus in the body of the shaft, in the large depression for the first metatarse at the root of the inner trochlea, in the shape of the shaft in section, in the sharp narrow ridge descending upon the middle of the plantar aspect of the shaft and diverging outwards to the proximal end of the outer trochlea, and finally, in the faint groove impressed by the internal digital branch of the tibial artery, commencing at the dorsal end of the foramen and winding inwards and downwards to the interval between the middle and inner trochleæ. In recent Australian pelicans the groove is sometimes faint, and its presence seems to be a rare peculiarity among birds in general.

The width of the trochlear expansion in the fossil is 16·5 mm.; in *P. conspicillatus* it is, between the same points, 20 mm.; the length distad from the proximal end of the hallucal depression is 26·5 mm., against 32·3 in the recent bird. In proportions the two are therefore nearly identical, but in size the living species exceeds the extinct by one-fourth of the latter.

Though it may fairly be doubted whether difference of size, even though accompanied by somewhat brighter or duller tints, as in our pittas and megaloprepias, is a sufficient mark of specific distinction between existing birds, it can hardly be refused distinctive value in the present case.

Proximal end of a metacarpal, with a large pneumatic foramen placed as in *Pelicanus;* the bone is too much crushed and distorted to allow of a description of any value.

Dromaius gracilipes, n.s. (Pl. xxiii., fig. 7*a* and 7*b*).

Though desire for more ample knowledge of the bird-life of the past naturally seeks indulgence in the cognition of new kinds, it may be content if the rare objects it delights in serve only to confirm previous interpretations and yield further elucidation of structure. This ground of satisfaction the rocks vouchsafe in the case of the extinct emu *Dromaius patricius*. Since certain of its remains were brought under notice* the following additional parts of its skeleton have been discovered :—A part of the distal end of a femur, the proximal third of a tarsometatarse, the calcaneal region of another metatarse, and the distal end of a third example of that bone. It was inferred from the remains then described that *D. patricius* possessed a proportionately shorter and stronger leg than the living species *D. novæ-hollandiæ*, and under the guidance of this conception, the distal extremity of a metatarse, which was observed to be even smaller and slimmer than that of the recent bird, was necessarily excluded from the bones referred to *D. patricius*, and the hope was entertained that sooner or later a fossil would be forthcoming to declare the exclusion justifiable. By good hap the expectation has been promptly realised. The true distal end of the metatarse of *D. patricius* proves to be conformable with the rest of the limb, and consequently the discarded fossil must be taken as presumptive evidence of the existence of a distinct species. Apart from size and proportions it is distinguished by a negative character peculiar to itself. It is well known that in the common emu, as in most birds, the main tibiometatarsal artery before reaching the trochlear expansion gives off a large branch—the plantar artery,—which, in order to reach the sole of the foot, passes through the bone between the bases of the middle and external trochlear processes by a perforation, which is the sole remnant of the original tripartite separation of the metatarsals. In the emu this perforation opens, not on the surface of the bone, but on the bottom of an oblong depression or pit, of which its oval aperture occupies more than the proximal half. Through the substance of the bone which forms the distal limit of the depression a second tunnel is driven longitudinally and opens upon the surface between the two trochleæ. The foramen of the anteroposterior or plantar canal is large—4·5 × 1·5 mm.—and its proximal end is 13.5 mm. from the intertrochlear surface.

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* P.L.S.N.S.W. Vol. iii. (2), pt. 3, p. 1290.

In *D. patricius* the plantar perforation is exceedingly small, not greater than the diameter of an ordinary pin, and this is situated close to the edge of the intertrochlear surface; the descending digital division of the artery passes along a deep canaliculate groove not roofed in by bone. *D. patricius* presents a middle term as to this point of structure between the living emu and the bird represented by the fossil under notice, for in the last there exists no trace whatever either of the plantar canal or of tunnel or groove for the descending branch of the artery. Possibly the bird should on this account be generically distinguished from *Dromaius*, but its separation, before we are better acquainted with it, would hardly be prudent. Unfortunately, the fossil is in a very imperfect condition; the outer trochlea is broken off close to the shaft, of the inner trochlea there only remains a portion, and the lateral ridges of the mesial trochlea are abraded. In addition to the absence of the arterial canal, inferior size, a sensible anteroposterior compression of the shaft, and a disproportionate length and tenuity of the mesial trochlea are the features which chiefly differentiate the fossil from the bone of the recent bird. The last two characters suggest the name *gracilipes* for the species. From the table of measurements appended it will be seen that in *D. patricius* this part of the leg was larger in almost all its dimensions than it is in the living species. The exceptional agreement which obtains in the width of the mesial trochlea, showing relative narrowness of that part, is a specific character; so also is the comparatively parallel direction of the lateral ridges of this trochlea, as they run proximad on the anterior aspect of the bone, maintaining the breadth of the pulley nearly to the junction of the process with the shaft. On the other hand, the measurements of *D. gracilipes* are all less than those of *D. novæ-hollandiæ,* with the exception of that of the body of the mesial trochlea; taken from centre to centre of the lateral depressions, this width is as much greater as the thickness of the shaft is less. As far as we can judge from this fragment, *D. gracilipes* was not only inferior in size to the living bird, but, on the whole, was more attenuated in the proportions of its limb.

The most interesting feature in its foot is the disproportionate size of the middle toe: this, together with the absence of the arterial perforation, seems to prepare the way for the following bird.

Measurements.

	D. patricius.		*D. novæ-hollandiæ.*		*D. gracilipes.*
Trochlear expansion, palmar aspect over all	54·5	...	50	...	
Width of shaft in a line corresponding to proximal end of plantar foramen in living species	40	...	36·5	...	34
Length of mesial trochlea, anterior aspect.....	36	...	31	...	28·5
Length from transverse line of measurement to end of mesial trochlea	37	...	36	...	33·5
Thickness of shaft at middle of transverse line	16·5	...	13	..	11·5
Width of mesial trochlea, over all	26·5	...	26	...	
Width of same between centres of lateral depressions	15	...	11	...	12·5

Fam. APTERYGIDÆ, gen. et sp. nov.

From among several hundred specimens forming an amateur's hoard of Nototherian fossils, lately added to those in the writer's charge, three only appertained to the birds of that age. One of these at once admitted itself to be a fragment from the foot of the emu *D. patricius*, in another was detected a duplicate of the type example of the mound-builder *Chosornis*, the third came with so peculiar a facies as to baffle recollection and inflame curiosity. A distal half or somewhat less of a tarso-metatarsus, it was immediately confronted with each one of a hundred metatarsals supplied by the chief types of the Australian birds now existing, and, failing to fraternize with any of them, was reluctantly laid aside in favour of less reserved candidates for examination. In an idle moment some weeks later it chanced that the corresponding bone of a young *Apteryx*, *A. mantelli*, was taken in hand, and to his surprise the observer found himself at last in the presence of the more salient features of the fossil. As may be imagined, the two bones were quickly laid side by side and discussed. Whether the result of the comparison be a legitimate conclusion from the premisses or not it is for others to consider, for the future to decide. It can only be pleaded by the way that while "expectant attention" had no part in the recognition of the bone, the just demands upon observant attention made by so significant a fossil have been admitted and honoured.

From the accompanying figures of this bone (Pl. xxiii., fig. 8*a* and 8*b*) it will be seen that its most striking feature is the extension distad of what may be called the pedicels of its trochleæ, that is of the metatarsal elements after their release from confluence in the shaft, the trochlear surfaces not included. In contrast with those of all other birds examined, the trochleæ almost appear to be borne on the ends of moderately long stalks. In carinate birds the existence of a pedicel so defined is hardly recognizable on the dorsal side of even the mesial trochlea, and on the plantar surface, which is usually less invaded by an extension of the groove of the pulley, the length of the pedicel is seldom if ever greater than its breadth at the base. The statement is warranted by certain *Anseres* (*Chenopis*, *Biziura*) which have the longest pedicels observed. Still shorter of course are the bases of the lateral trochleæ in the *Carinatæ*. Among the *Ratitæ* the only genus possessing pedicels which are conspicuously elongated and of equal length on both surfaces is, so far as the writer's experience extends, *Apteryx*. But the characterization imparted by their unusual length is exactly that which was antedated in greater force in the fossil, while there is also exhibited by the extinct bone a like equality in the length of the opposed surfaces of the lateral pedicels. It may be thought that this greater freedom of the distal ends of the bone is probably the ordinary condition of immaturity. To meet this very obvious objection, young metatarsals have been procured from a considerable number of birds of different families, all of which show confluence of the metatarsal elements to the same extent distad as in adults.

Associated with lengthened pedicels we see both in the *Apteryx* and in the fossil bird approximate equality in length attained by the lateral trochlear processes in their entirety, and, furthermore, an extension of the mesial trochlea almost entirely beyond the extremities of the other two. Greater weight will attach to a deduction from this composite character if one of the antecedents be expressed in the words of Owen, who, pointing out (Comp. Anat. of Vert. Vol. ii., p. 81) the leading differentiations of the metatarse in birds, says, "In the *Apteryx* and tridactyle cursores the mid-trochlea is the largest and extends by almost its whole length beyond the other two, which are nearly on a level." It is only necessary to add that the degree of extension of one lateral trochlea beyond the other is, allowing for difference of total dimensions, appreciably the same in the *Apteryx* and in the fossil.

In the absence of any feature proper to the *Carinatæ*, it would seem justifiable on the grounds already advanced to admit the extinct bird to a place in the apterygine division of the *Ratitæ*. But by way of fortifying the position taken up, it may be observed that there are other characters which, though less weighty, tend to confirm it. The distal end of the shaft in *Apteryx* is anteroposteriorly compressed and, in consequence of the divergence of the lateral pedicels commencing higher up the shaft than in other birds, laterally expanded. A glance at the figure (Pl. xxiii., figs. 8*a* and 8*b*), will show that the form of the shaft and the cause of its lateral expansion alike pre-existed in the fossil even more pronouncedly than in the living bird.

Again, in the whole number of recent metatarsals examined for the purpose, there is but one which shows on the surfaces of the shaft traces of embryonal conditions in the presence of lines of junction between its coalesced segments. As it is within the limits of possibility that none of these bones were derived from young birds, the immature metatarsals previously mentioned were examined for the lines of coalescence; uncertain indications of them appeared in a few, but in none were they continuous and well marked. In the bone from the foot of an example of *A. mantelli* which seemed to be nearly half grown, these lines are still apparent in the form of fine continuous grooves. At maturity they disappear altogether, as I learn from Professor Parker, who kindly examined for me his adult specimens and found complete anchylosis to have taken place in all. In the fossil metatarsal these lines are on the posterior side quite conspicuous, but, as in the kiwi, they are less distinct on the anterior, and, again as in the kiwi, they are interrupted in the middle of that side by complete confluence of the superficies. The fossil obviously came from a bird of nearly the same age as the *Apteryx* compared with it.

In the figure of the metatarsal of the *Apteryx* (Pl. xxiii., fig. 9*a*) there is shown on the dorsal side adjoining the trochleæ of the inner and mesial pedicels a large rough depression for the insertion of their extensor tendons. Among other living birds areas of insertion as great and definite as these have hitherto eluded the search of the observer. On the exterior pedicel of the fossil the same feature is seen to occur (Pl. xxiii., fig. 8*a*).

Finally, as in the example of *A. mantelli* before us, the shaft is not pierced by the tibial artery. But this character is of comparatively little value since the perforation is, as we have seen, absent in a bird which either belongs or is nearly related to *Dromaius*, and is present in Eyton's figure of the metatarse of *Apteryx australis*.

The features which have been noticed so far are those in which the fossil appears to be in close agreement with *Apteryx*. United they seem to justify the conclusion that in spite of all our preconceptions this Australian relic represents a bird having a decided family relationship with the *Apterygidæ* of New Zealand.

But even so it was not an *Apteryx*—this it asserts emphatically.

In the first place it had no traceable hind toe. The portion of the shaft preserved extends proximad far beyond the level of this toe in *Apteryx* and bears on its surface no sign of, not the slightest depression on its rotundity indicating, the existence of a hallucal metatarsal. In the immature *A. mantelli* the impression of the first metatarsal on the shaft is distinct, but considering that possibly it might be absent occasionally in this or other species the writer sought instruction from Professor Parker on this point also, and was very kindly informed by him that the impression is sometimes "nearly obsolete" in the living birds. As it appears from this that it is never entirely absent, we are at liberty to assume that the extinct bird was tridactyle, or, if we prefer it, had a hind toe in a still more rudimentary condition than *Apteryx*.

The elongation of the lateral pedicels, and especially that of the inner one, is carried to a considerably greater extent than in *Apteryx*, while their angles of divergence from the mesial pedicel are less.

More notable still as an index to the aptitudes of the bird, and tending moreover to explain the probable absence of the hind toe, is the size of the mesial pedicel, which is enlarged out of all proportion to the laterals. It is twice as broad as the inner, and two and a half times the breadth of the outer. Its trochlea evidently supported a toe which took a principal part in sustaining the weight of the body and was the main instrument of progression. It is therefore a fair inference that the cursorial power of the bird was much superior to that of the kiwis, and indeed it is scarcely too much to infer that in this important part of its organization the extinct bird was nearly as much an emu as an *Apteryx*.

Unconformably to the emu and kiwi alike is the inner trochlea with its pedicel, which in the fossil bird is or appears to be the longer of the two laterals—it is at least that trochlea which is on the thinner side of the shaft, the inner in *Apteryx*, which has the broader and more rhomboidal articulating surface, and which has the insertion of an extensor tendon stamped upon its pedicel.

The shaft, as before stated, is not perforated by the tibial artery, and herein agrees with the metatarsal of *A. mantelli* collated with it; but in the latter the artery in its passage between the outer and mesial pedicels is protected by a bony canal, almost amounting to a tunnel, developed in the angle formed by the pedicels; of this there is no trace in the fossil.

The magnitude of the middle toe, the superior length of the inner one of the laterals, the rudimentary state or complete absence of the hind toe are generic characters irreconcilable with *Apteryx.*

In stature the bird seems not to have exceeded the modern kiwis.

Dimensions.

	Fossil.		*A. mantelli.*
Length distad from termination of calcaneal groove	51·3	...	35·5
Trochlear expansion, over all	33·0	...	21·7
Breadth of shaft at point of fracture in fossil	12·0	...	7·0
Thickness at same point	8·3	...	5·0

If after forming its estimate of the intrinsic probabilities of the case the judgment can pronounce in favour of the view that the extinct bird stood well within the pale of the *Apterygidæ* while yet maintaining relations with the three-toed *Ratitæ* the name *Metapteryx bifrons* may seem somewhat appropriate, and provisionally this name is suggested.

Arrived at this goal without bias we may now permit ourselves to remember that the present is not the first intimation we have received of generic relations existing between the Australian and New Zealand struthiones. *Dromornis* is in great part a *Dinornis*, *Dinornis* itself has occurred in Queensland. These fossils and the present mutually support and illustrate each other. *Dinornithidæ* and *Apterygidæ* now conspire to establish the fact that Australia was the cradle of the birds whose latest phase of existence in a distant island will soon be but a tale told over a few bones.

The collection of fossils which has from time to time afforded tantalizing glimpses of the bird realm of an earlier Australia, a realm doubtless no less populous than in the present, much more so if the ratio of bird to beast obtained then as now, after disclosing less than the twentieth part of the number of existing land and fresh water birds, ceases to supply information.

Numerous bones, indeed, remain unnoticed, but they are heads of fibulas, phalanges of toes, fragments of ribs, waterworn relics of sterna, all barren of instruction. An opportunity, therefore, fairly offers of summing up the knowledge we seem to have acquired from the collection in this its initial stage ; and if the great slowness with which bird fossils are brought together be considered we shall have less difficulty in accepting the offer ; judging from past experience, it is not probable that a supplement to the following list will be necessary for some years, however soon a revision of its contents may be so judged by a succeeding observer.

List of Birds

(From the so-called Post-Pliocene Drifts of Queensland).

N.B.—For all names without authority stated the writer is responsible ; extinct genera in italics.

CARINATÆ.

Falconidæ.

Taphaetus brachialis, syn. *Uroaetus brachialis.*
Necrastur alacer.

Columbæ.

Lithophaps ulnaris.
Progura gallinacea.

Megapodidæ.

Chosornis præteritus

Grallæ.

Tribonyx effluxus, syn. *Fulica prior* (part).
Porphyrio (?) reperta.
Porphyrio (?) mackintoshi.
Fulica prior.
Gallinula strenuipes.
Gallinula peralata.
Lobivanellus sp.

CARINATÆ *(continued)*—

OTIDIDÆ, gen. et sp. ind.

ANSERES.

Anas elapsa.
Dendrocygna validipennis.
Biziura exhumata.
Nyroca robusta.
Nyroca sp.

HERODIONES.

Xenorhynchus nanus.
Palæopelargus nobilis.
Platalea (?) subtenuis.

STEGANOPODES.

Pelicanus proavus.
Plotus parvus.

RATITÆ.

CASUARIDÆ.

Dromaius patricius.
Dromaius gracilipes.

DINORNITHIDÆ.

Dromornis australis, Owen.
Dinornis queenslandiæ.

APTERYGIDÆ.

Metapteryx bifrons.

The whole of the twenty-eight species indicated and seven, or more probably eight, out of the twenty-four genera to which they are referred, are extinct. The extent of the change which the Nototherian avifauna of Queensland is thus shown to have undergone is very much the same as that observed in the case of the marsupials. With two or three *very doubtful* exceptions all these have submitted to specific metamorphosis, and of twenty-six of the old genera but fourteen survive. Has the change been rapid?

then from what cause? Not from the advent of man; savages do not exterminate. Have we hitherto considered this fauna younger than it really was? possibly, but for the solution of these questions we must look to further accumulation and study of palæontogical evidence. So far as the writer can see at present the Age of the fauna preserved in the Darling Downs deposits cannot well be later than Early Pliocene.

EXPLANATION OF PLATES.

Plate xxiv.

Fig. 1*a*.—*Necrastur alacer:* proximal end of right humerus; outer aspect.

Fig. 1*b*.—*Necraster alacer:* proximal end of right humerus; inner aspect.

Fig. 2*a*.—*Porphyrio mackintoshi:* distal extremity of a right tarsometatarse; posterior side.

Fig. 2*b*.—*Porphyrio mackintoshi:* distal extremity of a right tarsometatarse; anterior side.

Fig. 3*a*.—*Gallinula peralata:* humerus; outer aspect.

Fig. 3*b*.—*Gallinula peralata:* humerus; inner aspect.

Fig. 4*a*.—*Palæopelargus nobilis:* distal end of a right "medius" metacarpal.

Fig. 4*b*.—*Palæopelargus nobilis:* distal end of a right "medius" metacarpal.

Fig. 5*a*.—*Platalea subtenuis:* proximal end of right femur; inner aspect.

Fig. 5*b*.—*Platalea subtenuis:* proximal end of right femur; outer aspect.

Fig. 6*a*.—*Pelicanus proavus:* left tarsometatarsal; posterior side.

Fig. 6*b*.—*Pelicanus proavus:* left tarsometatarsal; anterior side.

Plate xxiii.

Fig. 7*a*.—*Dromaius gracilipes:* distal end of tarsometatarse; posterior side.

Fig. 7*b*.—*Dromaius gracilipes:* distal end of tarsometatarse; anterior side.

Fig. 8*a*.—*Metapteryx bifrons:* distal half of tarsometatarse; anterior side.

Fig. 8*b*.—*Metapteryx bifrons:* distal half of tarsomctatarse; posterior side.

Fig. 9*a*.—*Apteryx mantelli:* tarsometatarse; anterior side.

Fig. 9*b*.—*Apteryx mantelli:* tarsometatarse; posterior side.